

## Two New Species of the Genus *Holaspulus* (Acarina: Gamasida: Parholaspidae) from the Ryukyu Islands, Japan

KAZUO ISHIKAWA

Laboratory of Biology, Matsuyama Shinonome College,  
Matsuyama 790, Japan

**ABSTRACT**—Two new mite species of the genus *Holaspulus* belonging to the gamasid family Parholaspidae are described from litter or soil layer of the Ryukyu Islands: *H. reticulatus* and *H. ishigakiensis*.

The genus *Holaspulus* was proposed by Berlese in 1904 for *Holostaspis* (*Holaspulus*) *tenuipes* from Italy [1], and was later dealt with by Evans [2], Krantz [5] and Ishikawa [3, 4].

The Ryukyu Archipelago consists of a chain of many islands and harbours various animals of zoogeographic interest. From the acarological viewpoint, it is worth noting that a plesiomorphic species with claws on the tarsus I was found by this study. In the present paper, the author is going to describe two new species, *Holaspulus reticulatus* sp. nov. and *H. ishigakiensis* sp. nov. The holotype, allotype and a part of paratypes of the new species are deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo. The remaining paratypes are retained in the collection of the Laboratory of Biology, Matsuyama Shinonome College, Matsuyama.

### MATERIALS AND METHODS

Litter or soil samples were brought back to the author's laboratory in the cotton bags, and the mites were extracted from the samples by using modified Tullgren apparatus. The specimens were preserved in 70% ethanol, cleared in lactophenol, and mounted in Hoyer's medium. The holotype or allotype were used in measuring the length of dorsal setae, gnathosoma and legs.

### DESCRIPTION

#### *Holaspulus reticulatus* sp. nov.

[Japanese name: Iriomote-heragehokodani]  
(Fig. 1 A-G)

**Female.** Length of idiosoma ca. 590  $\mu\text{m}$ ; width of idiosoma ca. 390  $\mu\text{m}$ ; length of dorsal shield with a range of 553–592  $\mu\text{m}$ , av. 569  $\mu\text{m}$ ; width of dorsal shield at the level of coxae IV with a range of 290–332  $\mu\text{m}$ , av. 313  $\mu\text{m}$ ; light brown in colour.

**Dorsum.** Dorsal shield sclerotized and ornamented with punctations and reticulations, especially in the posterior portion. Dorsal shield bearing thirty pairs of setae, which are spatulate distally except for simple and minute setae *z1*,

and with twenty-two pairs of pores. Extra-marginal setae spatulate distally and lying on striated lateral interscutal membrane. Length of setae (the length of dorsal shield of holotype 560  $\mu\text{m}$ ): verticals *z1* 41  $\mu\text{m}$ , *j2* 38  $\mu\text{m}$ , *j3* 34  $\mu\text{m}$ , *j4* 33  $\mu\text{m}$ , *j5* 30  $\mu\text{m}$ , *j6* 33  $\mu\text{m}$ , *J1* 35  $\mu\text{m}$ , *J2* 26  $\mu\text{m}$ , *J6* 43  $\mu\text{m}$ , *z1* 3  $\mu\text{m}$ , *z2* 40  $\mu\text{m}$  and humerals *r2* 50  $\mu\text{m}$ . The distribution of setae and pores are as shown in Figure 1A.

**Venter.** Tritosternum well developed, a pair of pilose laciniae more than twice longer than tritosternal base. Pre-sternal shields composed of a pair of narrow platelets. Sternal shield ornamented with a network of ridges and punctations, and fused with endopodal shields. Sternal setae I longer than setae II and III, setae III lying well inside the bases of setae II. Metasternal shields narrow, located behind the posterior angles of sternal shield, and with a pair of simple setae and pores. Epigynial shield coalesced posteriorly with ventri-anal shield, and with a pair of genital setae. Ventri-anal shield fused with epigynial, podal-peritrematal shields, and with four pairs of preanal setae in addition to three perianal ones. Expulsory vesicles of ventri-anal shield absent. Interscutal membrane between dorsal and ventral shields bearing fourteen pairs of setae, seven of which are conspicuously spatulate. Metapodal shields present. Stigmata situated at a position antero-lateral to coxae IV. Peritremes extending to coxae I.

**Gnathosoma.** Epistome consisting of elongated median and lateral extensions, and with denticulated anterior margin. Palpal apotele bearing three tines, two of which are spatulate distally. Fixed digit of chelicera tridentate and with a pilus dentilis; the movable digit (150  $\mu\text{m}$ ) is bidentate and longer than corniculus (116  $\mu\text{m}$ ). Length of anterior hypostomatic seta 53  $\mu\text{m}$ , external posterior hypostomatic seta 25  $\mu\text{m}$ , internal posterior hypostomatic seta 25  $\mu\text{m}$  and deutosternal seta 22  $\mu\text{m}$ .

**Legs.** Tarsus I with neither claws nor pulvilli; tarsus I (168  $\mu\text{m}$ ) much longer than tibia I (77  $\mu\text{m}$ ). Tarsi II to IV each with well developed claws and pulvilli. Length of legs: I (excl. sensory setae) 578  $\mu\text{m}$ , II 460  $\mu\text{m}$ , III 385  $\mu\text{m}$  and IV 501  $\mu\text{m}$ .

**Male.** Length of idiosoma ca. 513  $\mu\text{m}$ ; width of idiosoma ca. 325  $\mu\text{m}$ ; length of dorsal shield with a range of 480–518  $\mu\text{m}$ , av. 503  $\mu\text{m}$ ; width of dorsal shield at the level of

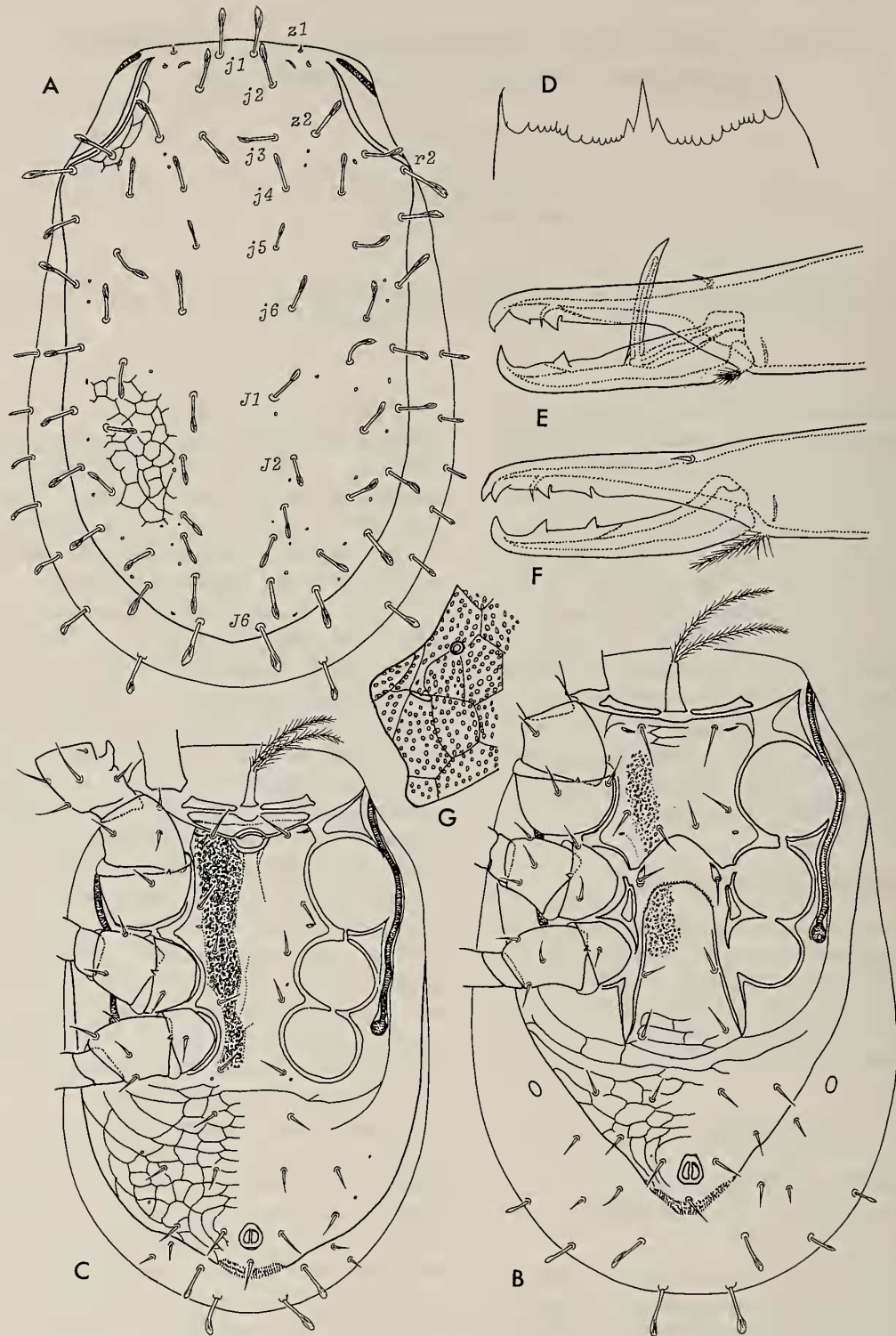


FIG. 1. *Holaspulus reticulatus* sp. nov. (A-B, D, F-G, female; C, E, male). A, Dorsum; B-C, venter; D, epistome; E-F, chelicera; G, ornamentation of sternal shield.

coxae IV with a range of 290–328  $\mu\text{m}$ , av. 311  $\mu\text{m}$ .

Dorsal chaetotaxy and ornamentation similar to those of female. Sterniti-genital portion ornamented with network and punctations, and with five pairs of simple setae. Ventri-anal portion reticulated and with four pairs of simple setae

and three perianal setae. Fixed digit of chelicera bidentate; movable digit (127  $\mu\text{m}$ ) unidentate and approximately twice the length of spermatodactyl (63  $\mu\text{m}$ ). Tarsus I without claws and pulvilli. Femur II with a large thumb-like spur, and genu, tibia and tarsus II each with a small spur. Length

of legs: I (excl. sensory setae) 562  $\mu\text{m}$ , II 450  $\mu\text{m}$ , III 378  $\mu\text{m}$  and IV 493  $\mu\text{m}$ .

*Type series.* Holotype ♀ (NSMT-Ac 10429) and allotype ♂ (NSMT-Ac 10430), Kanbira-no-taki, Iriomote Is., Ryukyus, 3-X-1978, K. Ishikawa. Paratypes: 6 ♀ ♀,

8 ♂ ♂, same data as the holotype; 5 ♀ ♀, 3 ♂ ♂, Ohtomi, Iriomote Is., Ryukyus, 4-X-1978, K. Ishikawa.

*Remarks.* No close relatives of this new species have been known up to now. However, this species may be remotely related to *Holaspulus ishigakiensis* sp. nov., from

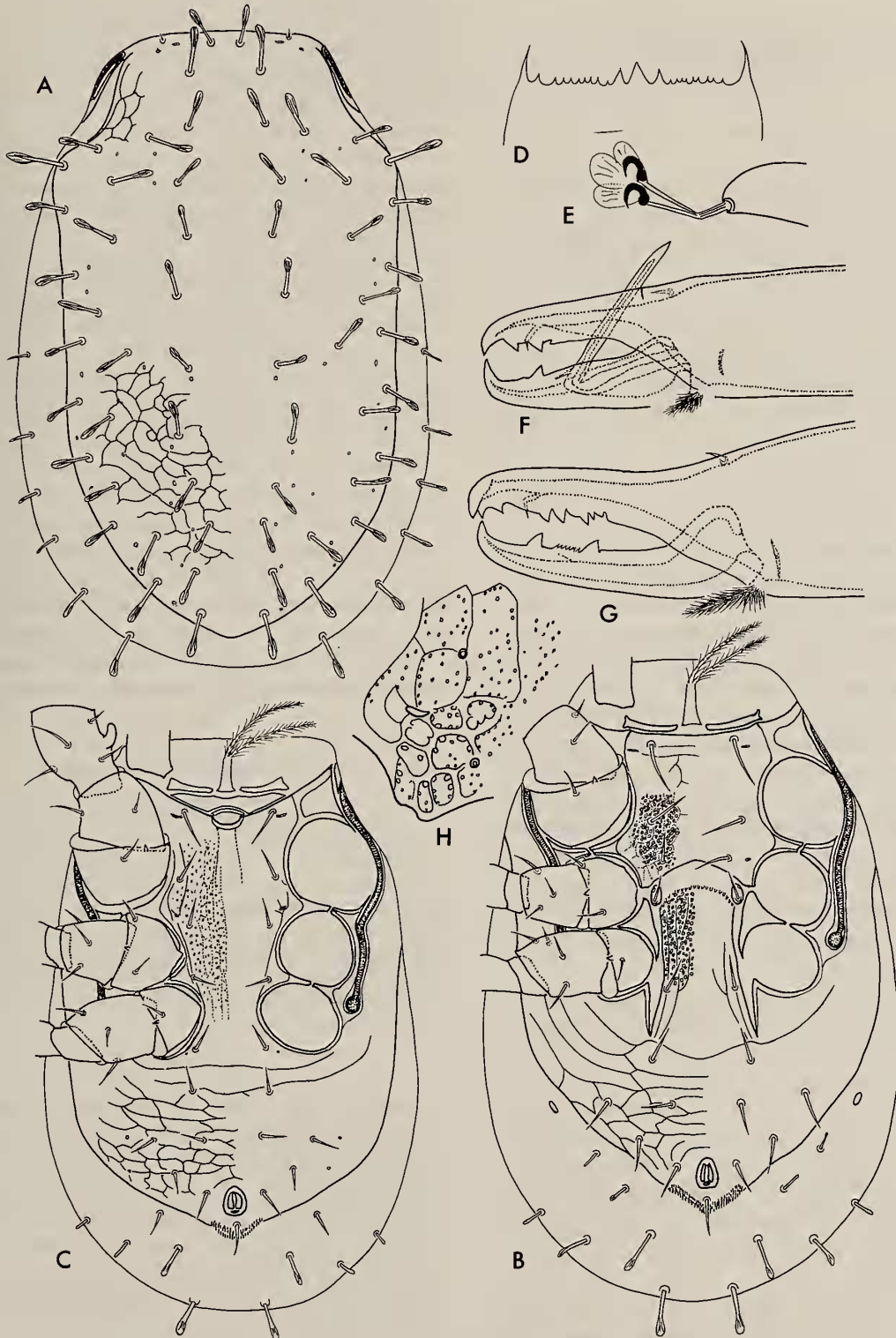


FIG. 2. *Holaspulus ishigakiensis* sp. nov. (A-B, D, G-H, female; C, E-F, male). A, Dorsum, B-C, venter, D, epistome; E, claws of tarsus I; F-G, chelicera; H, ornamentation of sternal shield.



Ishigaki Is., because of the following characteristic features: movable digit of chelicera of female with two large teeth, instead of bearing two large and several small teeth; tarsus I of male without claws and pulvilli, instead of the presence of claws and pulvilli.

*Holaspulus ishigakiensis* sp. nov.

[Japanese name: Ishigaki-heragehokodani]

(Fig. 2 A-H)

*Female.* Length of idiosoma ca. 570  $\mu\text{m}$ ; width of idiosoma ca. 380  $\mu\text{m}$ ; length of dorsal shield with a range of 523–565  $\mu\text{m}$ , av. 546  $\mu\text{m}$ ; width of dorsal shield at the level of coxae IV with a range of 290–347  $\mu\text{m}$ , av. 312  $\mu\text{m}$ .

*Dorsum.* Dorsal shield sclerotized and ornamented with punctations and reticulations, particularly in the posterior portion. Dorsal shield provided with thirty pairs of setae and twenty-two pairs of pores; its setae spatulate distally with the exception of simple minute setae *z1*. Extramarginal setae spatulate distally and increasing in length from anterior to posterior. Length of setae (the length of dorsal shield of holotype 550  $\mu\text{m}$ ): verticals 40  $\mu\text{m}$ , *j2* 38  $\mu\text{m}$ , *j3* 37  $\mu\text{m}$ , *j4* 34  $\mu\text{m}$ , *j5* 32  $\mu\text{m}$ , *j6* 36  $\mu\text{m}$ , *J1* 29  $\mu\text{m}$ , *J2* 33  $\mu\text{m}$ , *J6* 41  $\mu\text{m}$ , *z1* 2  $\mu\text{m}$ , *z2* 41  $\mu\text{m}$  and humerals 55  $\mu\text{m}$ . The distribution of setae and pores are as shown in Figure 2A.

*Venter.* Tritosternum well developed, a pair of pilose laciniae more than twice as long as tritosternal base. Pre-sternal shields consisting of a pair of narrow platelets. Sternal shield ornamented with network and closely set punctations; three pairs of simple setae present, setae III lying well inside the bases of setae II. Metasternal shields free, and with a pair of simple setae and pores. Epigynial shield fused posteriorly with ventri-anal shield, and with a pair of simple setae. Ventri-anal shield fused with epigynial, podal-peritrematal shields, and with four pairs of preanal setae and three perianal setae. Expulsory vesicle of ventri-anal shield absent. Interscutal membrane between dorsal and ventral shields bearing twelve pairs of setae, six pairs of which are conspicuously spatulate. Metapodal shields present. Stigmata located at a position antero-lateral to coxae IV. Peritremes extending to coxae I.

*Gnathosoma.* Epistome with spinose median projection, and with several short spines on either side and a pair of elongate lateral extensions. Palpal apotele provided with three tines, two of which are spatulate distally. Fixed digit of chelicera with six teeth and a pilus dentilis; the movable digit (123  $\mu\text{m}$ ) is bidentate in addition to several small teeth, and longer than corniculus (108  $\mu\text{m}$ ). Salivary stylus (95  $\mu\text{m}$ ) well developed. Length of anterior hypostomatic seta 67  $\mu\text{m}$ , external posterior hypostomatic seta 32  $\mu\text{m}$ , internal posterior hypostomatic seta 36  $\mu\text{m}$  and deutosternal seta 30  $\mu\text{m}$ .

*Legs.* Tarsus I (192  $\mu\text{m}$ ) much longer than tibia I (87  $\mu\text{m}$ ), without claws and pulvilli. Tarsi II to IV each with well developed claws and pulvilli. Length of legs: I (excl. sensory setae) 578  $\mu\text{m}$ , II 440  $\mu\text{m}$ , III 380  $\mu\text{m}$  and IV 478  $\mu\text{m}$ .

*Male.* Length of idiosoma ca. 500  $\mu\text{m}$ ; width of idiosoma ca. 320  $\mu\text{m}$ ; length of dorsal shield with a range of 475–527  $\mu\text{m}$ , av. 493  $\mu\text{m}$ ; width of dorsal shield at the level of coxae IV with a range of 280–305  $\mu\text{m}$ , av. 292  $\mu\text{m}$ .

The chaetotaxy and ornamentation of dorsal shield are essentially the same as in the female. Sterniti-genital portion ornamented with network and punctations. Ventri-anal portion reticulated and provided with four pairs of simple setae and three perianal ones. Fixed digit of chelicera bidentate; movable digit (95  $\mu\text{m}$ ) unidentate and longer than spermatodactyl (74  $\mu\text{m}$ ). Each tarsus provided with claws and pulvilli. Femur II with a large thumb-like spur, and genu, tibia and tarsus II each with a small spur. Length of legs: I (excl. sensory setae) 561  $\mu\text{m}$ , II 458  $\mu\text{m}$ , III 370  $\mu\text{m}$  and IV 443  $\mu\text{m}$ .

*Type series.* Holotype ♀ (NSMT-Ac 10431) and allotype ♂ (NSMT-Ac 10432), Kabira, Ishigaki Is., Ryukyus, 10-VII-1987, K. Ishikawa. Paratypes: 7 ♀ ♀, 4 ♂ ♂, same data as the holotype; 2 ♀ ♀, 3 ♂ ♂, Yoon, Ishigaki Is., 6-XII-1972, J. Aoki; 5 ♀ ♀, 3 ♂ ♂, Mt. Yonahadake, Okinawa Is., 6-X-1978, K. Ishikawa; 6 ♀ ♀, 5 ♂ ♂, Yonehara, Ishigaki Is., 2-X-1978, K. Ishikawa.

*Remarks.* The present species differs from the previously known members of the genus *Holaspulus* in the movable digit of the female chelicera provided with two large and several small teeth, instead of only two large teeth. On the other hand, this species seems closely related to *H. reticulatus* sp. nov., from Iriomote Is., but is distinguished from that species by the following points: tarsus I of male provided with claws and pulvilli, instead of lacking them; the length of spermatodactyl is 0.8 times that of movable digit, instead of 0.5.

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